

C L A I M S

1. A magnetron oscillator characterized by
2 comprising:
3 a first magnetron;
4 a launcher which extracts an output power of
5 said first magnetron;
6 an impedance generator which has one terminal
7 connected to an output terminal of said launcher, and
8 adjusts a load impedance of said first magnetron; and
9 a reference signal supplier which is connected
10 to the other terminal of said impedance generator, and
11 supplies, to said first magnetron, a reference signal
12 lower in electric power and stabler in frequency than
13 the output from said first magnetron.

2. A magnetron oscillator according to claim
2 1, characterized in that at least one of the load
3 impedance of said first magnetron and the electric power
4 of the reference signal supplied from said reference
5 signal supplier changes in synchronism with the output
6 power of said first magnetron.

3. A magnetron oscillator according to claim
2 1, characterized by further comprising a synchronous
3 controller which controls at least one of said impedance
4 generator and said reference signal supplier on the
5 basis of at least one of an anode current and the output
6 power of said first magnetron.

4. A magnetron oscillator according to claim

2 3, characterized in that said synchronous controller
3 comprises:
4 a detection unit which detects at least one of
5 the anode current and output power of said first
6 magnetron;
7 a data storage unit which stores
8 characteristic data of said first magnetron; and
9 a control unit which controls at least one of
10 said impedance generator and said reference signal
11 supplier by referring to the characteristic data stored
12 in said data storage unit on the basis of a detection
13 result from said detection unit.

5. A magnetron oscillator according to claim
2 1, characterized in that said reference signal supplier
3 comprises:
4 a reference signal oscillator which oscillates
5 the reference signal; and
6 an irreversible member which guides the
7 reference signal from said reference signal oscillator
8 to said impedance generator, and guides the output power
9 of said first magnetron, which is supplied from said
10 impedance generator, in a direction of a load.

6. A magnetron oscillator according to claim
2 5, characterized in that said irreversible member is one
3 of a circulator, a directional coupler, and a
4 branching/coupling device.

7. A magnetron oscillator according to claim

2 5, characterized in that said reference signal supplier
3 further comprises an amplifier which amplifies the
4 reference signal from said reference signal oscillator.

8. A magnetron oscillator according to claim
2 7, characterized in that

3 said amplifier comprises a plurality of
4 amplifiers, and

5 said plurality of amplifiers are connected in
6 series or parallel.

9. A magnetron oscillator according to claim
2 5, characterized in that said reference signal supplier
3 further comprises a second magnetron having an output
4 power higher than that of said reference signal
5 oscillator and lower than that of said first magnetron,
6 and supplies, to said first magnetron, an output power
7 of said second magnetron having an oscillation frequency
8 locked to a frequency of the reference signal by
9 injection of the reference signal.

10. A magnetron oscillator according to claim
2 1, characterized by further comprising an isolator which
3 is connected between said reference signal supplier and
4 a load, absorbs a reflected power from said load, and
5 guides the output power of said first magnetron, which
6 is supplied from said reference signal supplier, in a
7 direction of said load.

11. A magnetron oscillator according to claim
2 10, characterized in that said isolator comprises:

3 a dummy load which absorbs an electric power;

4 and

5 a circulator which guides the reflected power
6 from said load to said dummy load, and guides the output
7 power of said first magnetron, which is supplied from
8 said reference signal supplier, in a direction of said
9 load.

 12. A magnetron oscillator according to claim
2 1, characterized in that

3 said reference signal supplier comprises:

4 a reference signal oscillator which oscillates
5 the reference signal;

6 an isolator having one terminal connected to
7 said reference signal oscillator; and

8 an irreversible member connected to the other
9 terminal of said isolator, the other terminal of said
10 impedance generator, and a load,

11 said irreversible member guides the output
12 power of said first magnetron, which is supplied from
13 said impedance generator, in a direction of said load,
14 and guides a reflected power from said load to said
15 isolator,

16 said isolator absorbs the reflected power from
17 said irreversible member, and guides the reference
18 signal from said reference signal oscillator to said
19 irreversible member, and

20 said irreversible member further guides the

21 reference signal from said isolator to said impedance
22 generator.

13. A magnetron oscillator according to claim
2 1, characterized in that said first magnetron comprises
3 a cathode which emits electrons when heated, a heater
4 which heats said cathode in accordance with an applied
5 voltage, and an anode which forms an electric field with
6 respect to said cathode, and
7 said magnetron oscillator further comprises a
8 heater power supply which decreases the voltage to be
9 applied to said heater as an electric current flowing
10 through said anode increases.

14. A magnetron oscillator according to claim
2 1, characterized by being used as a microwave power
3 supply of a plasma processor which performs
4 predetermined processing on an object to be processed,
5 by using a plasma generated by a microwave.